

RAF MOLESWORTH 2009 WATER QUALITY REPORT

Introduction

Air Force Instruction 48-144, *Safe Drinking Water Surveillance Program*, and the United States Environmental Protection Agency (USEPA) require all community water systems to provide their consumers an annual water quality report. This report will help consumers understand where their drinking water comes from and what is in it. It will help them to make informed choices that affect their families' health and help everyone understand the importance of protecting our drinking water sources.

Source Water

The 423rd Civil Engineer Squadron operates RAF Molesworth's potable water distribution system. Water is supplied by one source. The base purchases water from Anglian Water, the region's supplier. The Anglian Water feed is from their Huntingdon North Supply Zone, which originates from the Grafham Water Reservoir, via the Three Shires Water Tower.

Treatment Process

RAF Molesworth's water supply is sand filtered, ozonated and then carbon filtered by Anglian Water to remove particulates and volatile organic compounds and pesticides before being chlorinated using chloramine. Before distribution at the installation, the water is chlorinated again using sodium hypochlorite. Chlorination of the water supply is completed for disinfection purposes and prevents bacteriological growth in the distribution system.

Testing

A Bioenvironmental Engineering (BE) technician collects bacteriological samples from various locations in the water distribution system. These samples are analyzed in the BE water lab to ensure no bacteriological growth is present in the distribution system. BE also collects water samples from representative locations in the water system and sends them to Northumbrian Water Scientific Services laboratory for chemical

analysis and additional bacteriological testing. Northumbrian Water Scientific Services is headquartered in Newcastle upon Tyne, England, with laboratories throughout England, but primarily analyzing drinking water at their Horsley, Newcastle upon Tyne lab. Additionally, due to a history of false positives for a particular pesticide, as well as low EPA and FGS-UK requirements for detection limits, several water samples are sent to the US Army laboratory in Germany (USACHPPMEUR). The results are reviewed and maintained by the Bioenvironmental Engineering office at RAF Upwood to ensure compliance with safe drinking water standards.

Water Analysis Results

RAF Molesworth's water supply is tested for over 100 substances. The table below lists the contaminants detected that require reporting by the USEPA and the January 2005 US Department of Defense Environmental Final Governing Standards - United Kingdom (FGS-UK).

Drinking water, including bottled water, may reasonably be expected to contain at least a small amount of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA Safe Drinking Water Hotline at (800) 426-4791 or by going to their ground and drinking water website at <http://www.epa.gov/safewater>.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems and wildlife.

- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm runoff and industrial or domestic wastewater discharges.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff and residential use.
- Organic chemical contaminants, including synthetic or volatile organic chemicals, which are byproducts of industrial processes and can come from gas stations, urban storm water runoff and septic systems.
- Radioactive contaminants, which can naturally occur or be the result of industrial activities.

In order to ensure that tap water is safe to drink, limits/levels are established on the amount of certain contaminants that can be present in drinking water provided by public water systems. The limits below are from the FGS-UK. This document integrates U.S. and U.K. requirements by implementing the more stringent limit of any chemical regulated by either country.

Results Discussion

The results in the table below include all chemicals covered by the US EPA's Safe Drinking Water Act for which analysis was performed and concentrations of the chemicals that were detected from 1 January 2009 to 31 December 2009.

During CY 2009 sampling time frame, RAF Alconbury received a number of exceedances of the Maximum Contaminant Limit (MCL) for Dalapon. In result, the exceedances were determined to be 2, 2-Dichloropropanoic Acid; a disinfection-by-product (DBP) created during the sterilization of testing equipment using chlorinated or chloraminated water. This DBP has the same chemical make up as Dalapon, but can only be identified by analyzing samples from different sampling points within the drinking water system and comparing the two results. 2, 2-Dichloropropanoic acid is not a chemical of concern for the Environmental Protection Agency (EPA) or the Environmental Agency (EA) so is not monitored during routine sampling. USAFE HQ is aware of this problem and has addressed it in the new FGS-UK coming out later in the year.

Further information regarding Dalapon in drinking water and their health effects can be obtained by contacting Bioenvironmental Engineering Services at DSN 268-4507/4746 or commercial 07801880122.

Additional Health Information

Some individuals may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as those with cancer undergoing chemotherapy, those that have undergone organ transplants, individuals with HIV/AIDS or those with immune system disorders and some elderly and infants, can be particularly at risk from infections.

These people should seek advice about their drinking water from their health care providers. The USEPA and the US Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline (800) 426-4791.

Input and Information

If you any have questions, please contact TSgt Thomas Echelmeyer or SSgt Christopher Bert in Bioenvironmental Engineering Services, Upwood Clinic at DSN 247-4507/4746 or 07800 801 212.

TEST RESULTS

SUBSTANCE (* See note 1)	RANGE ND = None detected (See note 2)	MAXIMUM CONTAMINANT LIMIT (MCL)	POSSIBLE SOURCE (Applies to all water in general) & COMMENTS
22°C Plate Count	0 - 19 cfu/1 mL @ 22° C	No abnormal change	Abnormal Changes are defined by AES as >50 colonies
Plate Count (@37°C)	0-3 colonies/1 mL @ 37°C	No abnormal change	Abnormal Changes are defined by AES as >50 colonies
Alkalinity *	210 - 240 mg/L HCO ₃	30 mg/L HCO ₃ MINIMUM	
Barium	0.020-0.024mg/L	2 mg/L	Erosion of natural deposits
Calcium *	110 - 120 mg/L as Ca	250 mg/L as Ca	
Chloride *	62 - 78 mg/L	250 mg/L	
Color	1.3 – 1.4 mg/l Pt/Co scale	20 mg/l Pt/Co scale	
Conductivity	700 - 710 µS/cm at 20°C	2,500 µS/cm at 20°C	Some conductivity is expected in drinking water
Copper*	0.053 - 0.15 mg/L	2 mg/L	Corrosion of plumbing system
Dalapon	0.000073– 0.0005 mg/L	0.0001 mg/L	Suspected byproduct introduced during to chlorination process
Dioxin / Furan Total	0.5 – 5.2 pg/L	30 pg/L	Also known as 2, 3, 7, 8-TCDD. Emission from combustion or runoff from herbicides (silvex). The calculated dioxins are only the 17 hazardous dioxin (I-TEQ)
Dry Residues at 180°C *	480-500 mg/L	1500 mg/L	
Gross Alpha	ND - 0.73 pCi/L	15 pCi/L	A natural element of the Earth's crust
Gross Beta	5.95 – 7.56 pCi/L	50 pCi/L	A natural element of the Earth's crust
Lead	.00015 - 0.0024 mg/L	0.025 mg/L	Corrosion of household plumbing systems; erosion of natural deposits
Magnesium *	8.4 – 8.6 mg/L	50 mg/L	
pH (Hydrogen Ion)*	7.9 - 8.1	5.9 - 9.5	Drinking water is expected to have a fairly neutral pH amount (5.5-9.5)
Phosphorus	0.70 – 1.0 mg/L	2.2 mg/L	Occurs naturally in rocks and other mineral deposits and is realed by weathering
Potassium*	8.4 – 9.9 mg/L	12 mg/L	Released naturally from clay materials and minerals in the Earth's surface
Total Hardness *	120 - 130 mg/L Ca	60 mg/L Ca MINIMUM	
Total Pesticides	ND – 0.000019 mg/L	0.0005 mg/L	All individual pesticides are calculated together for each sample.
TTHM	0.00457 – 0.00524 mg/L	0.1 mg/L	By-product of drinking water chlorination
Turbidity *	ND - 0.54 NTU	4 NTU	Measure of water clarity, not health related
Zinc *	0.0053 – 0.0063 mg/L	4 mg/L	

Definitions:

° C – degrees in Celsius

Ca – chemical symbol for calcium. Minerals found in hard water caused by limestone, chalk and in other mineral deposits.

FGS-UK - Final Governing Standards for the United Kingdom - The governing environmental regulation for US military bases in the UK.

HCO₃ – Alkalinity is expressed in HCO₃, a bicarbonate. HCO₃ is a vital component in a pH buffering system. It is a salt that helps maintain a neutral pH in the water.

MCL - Maximum Contaminant Level - The highest level of contaminant that is allowed in drinking water. MCLs are enforceable standards.

mg/L - milligrams per liter - A unit of measure used to describe the levels of detected contaminants. 1 milligram per liter is equivalent to 1 part per million.

ND - Not Detected - No chemical detected; however, laboratories can only detect a specified quantity or concentration of the chemical in drinking water. This is known as the Limit of Detection.

NTU - Nephelometric Turbidity Units. A unit used to describe the clarity of water. Higher numbers relate to more cloudy water.

PAH - Polycyclic Aromatic Hydrocarbons. The sum of the detected concentrations of benzo-3,4(b)-fluoranthene, benzo-11,12(k)-fluoranthene, benzo-1,12(ghi)-perylene, and indeno-(1,2,3-cd)-pyrene.

PCV - Prescribed Concentration or Value - The maximum concentration of a contaminant or the maximum value of any parameter, which might affect the wholesomeness, or aesthetics of a water supply.

pCi/L - picocuries per liter. Measure of radioactivity in water.

pg/L - picograms per Liter. Unit of measurement expressing the amount of chemicals in water. 1 picogram per liter is equivalent to 1 part per quadrillion.

TTHM - Total Trihalomethanes. The sum of the detected concentrations of chloroform, bromoform, dibromochloromethane, and bromodichloromethane in mg/L.

µS/cm - microsiemens per centimeter. Is a unit expressing the amount of electrical conductivity of a solution.

NOTES:

(1) Items marked with an asterisk (*) are 'secondary standards' with a PCV rather than an MCL. See PCV and MCL definitions above. Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic or aesthetic effects in drinking water.

(2) Limitations in laboratory performance results in analysis for some contaminants being reported as "not detected (ND)." The lowest level of contaminant that the laboratory can detect is called the Limit of Detection (LOD). In 2009, levels of contaminants were verified to be below the FGS-UK MCL; therefore, compliance was met.